WTR 31
3.2.06
WILL CLEAN HOT SPOTS OVER 1000.
CAP TO BACKFILL

Chesapeake

SITE CHARACTERIZATION

COOPER 7 NO. 1 DRILLING PIT

REF: 160014

UL-D (NW¼ OF THE NW¼) OF SECTION 7, T20S, R37E

~13.5 MILES SOUTHWEST OF HOBBS

LEA COUNTY, NEW MEXICO

LATITUDE: N 32° 35' 35.6" LONGITUDE: W 103° 17' 47.1"

DECEMBER 2005

PREPARED BY:

Environmental Plus, Inc.
2100 Avenue O
P.O. Box 1558
Eunice, NM 88231
Phone: (505)394-3481
FAX: (505)394-2601
dduncan@envplus.net

application - pPAC 0606229007

Distribution List

Site Characterization Report

Cooper 7 No. 1

Ref. #160014

Name	Title	Company or Agency	Mailing Address	e-mail
Larry Johnson	Environmental Engineer	New Mexico Oil Conservation Division-Hobbs	1625 N. French Drive Hobbs, New Mexico 88240	lwjohnson@state.nm.us
Bradley Blevins	Field Supervisor	Chesapeake Operating, Inc.	P.O. Box 190 Hobbs, New Mexico 88240-0190	bblevins@chkenergy.com
Jace Marshall	Safety and Environmental Representative	Chesapeake Energy	6100 N. Western Ave. Oklahoma City, OK 73118	jmarshall2@chkenergy.com
Curtis Blake	Superintendent	Chesapeake Operating, Inc.	P.O. Box 190 Hobbs, New Mexico 88240-0190	cblake@chkenergy.com
Jimmie T. Cooper	Property Owner	--	P.O. Box 55 Monument, New Mexico 88265	(505) 397-2045 (Home Phone) (505) 369-7108 (Mobile)
File	--	Environmental Plus, Inc.	P.O. Box 1558 Eunice, New Mexico 88231	dduncan@envplus.net

STANDARD OF CARE

Site Characterization

Cooper 7 No. 1 Drilling Pit

Ref. #160014

The information provided in this report was collected consistent with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and Releases (August 13, 1993), the NMOCD Unlined Surface Impoundment Closure Guidelines (February, 1993) and Environmental Plus, Inc. (EPI) Standard Operating Procedures and Quality Assurance/Quality Control Plan. The conclusions are based on field observations and laboratory analytical reports as presented in the report. Recommendations follow NMOCD guidance and represent the professional opinions of EPI staff. These opinions were derived using currently accepted geologic, hydrogeologic and engineering practices at this time and location. The report was prepared or reviewed by a certified or registered professional with a background in engineering, environmental and/or natural sciences.

This report was prepared by:

David P. Duncan
Civil Engineer

Date

This report was reviewed by:

Iain A. Olness, P.G.
Hydrogeologist

Date

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APPENDICES

1.0 Summary

On June 29, 2005, Chesapeake Operating, Inc. retained Environmental Plus, Inc. (EPI) to conduct drilling pit closure work consistent with NMOCD Pit and Below-Grade Tank Guidelines (November, 2004) on the Cooper 7 No.1 drilling pit. The site is located in Lea County, New Mexico in the NW ¼ of the NW ¼ of Section 07, Township 20 South, Range 37 East. More specifically, the site is located approximately 13.5 miles southwest of Hobbs, New Mexico on property owned by Mr. Jimmy Cooper (reference *Figures 1 & 2)*.

EPI performed GPS surveying, photography and characterization of the site on June 29, 2005. Form C-103 was submitted to the New Mexico Oil Conservation Division (NMOCD) on July 18, 2005 documenting the site and proposed operations. The drilling pit entailed a surface area of approximately 14,600 square feet (ft^2) with a depth of ±8-feet below ground surface (bgs) (reference *Figure 3*).

From July 13 through July 22, 2005, EPI personnel excavated and transported approximately 1,666 cubic yards (yd^3) of material from the drill pit to Sundance Services, Inc., of Eunice, New Mexico for disposal. On July 22, 2005 grab samples were collected from five (5) sample points excavated beneath the pit floor (reference *Figure 4*) with a portion of each sample placed in laboratory provided containers and immediately put on ice for transport to Cardinal Laboratories of Hobbs, New Mexico for quantification of chloride concentrations (reference *Attachment II*). The remaining portion of the sample was analyzed in the field for chloride concentrations utilizing a LaMotte Chloride Test Kit. Field analytical results indicated concentrations ranging from 250 mg/Kg to 5,280 mg/Kg (reference *Table 1*).

From October 3 through October 4, 2005, four (4) soil borings were advanced to different depths at the same location as the previous sample points in the pit bottom with the exception of sample point SP-4 (reference *Figure 5*). A soil boring was not completed at this location as previous analytical results indicated chloride concentrations below 250 mg/Kg at 14-feet bgs (reference *Table 1*). Samples were collected from the soil boring with a portion of each sample placed in laboratory provided containers and immediately put on ice for transport to Cardinal Laboratories of Hobbs, New Mexico for quantification of total petroleum hydrocarbons (TPH) and chloride concentrations (reference *Attachment I*). The remaining portion of each sample was analyzed in the field for the presence of organic vapors utilizing a MiniRae® photoionozation detector (PID) equipped with a 9.8 electron-volt (eV) lamp and chloride concentrations utilizing a LaMotte Chloride Test Kit. Field analytical results indicated organic vapor concentrations ranged from 0.2 to 6.3 parts per million (ppm) and chloride concentrations ranged form 240 to 800 mg/Kg (reference *Table 1*).

2.0 Site Description

2.1 Geological Description

The United States Geological Survey (USGS) Ground-Water Report 6, *"Geology and Ground-water Conditions in Southern Lea County, New Mexico," A. Nicholson and A. Clebsch, 1961*, describes the near surface geology of southern Lea County as "an intergrade of the Quaternary Alluvium (QA) sediments (i.e., fine to medium sand) with the mostly eroded Cenozoic Ogallala (CO) formation. Typically, the QA and CO formations in the area are capped by a thick interbed of caliche and generally overlain by sandy soil."

The release site is located in the Eunice Plain physiographic subdivision, described by Nicholson & Clebsch as an area "underlain by a hard caliche surface and is almost entirely covered by reddish-brown dune sand." The thickness of the sand cover ranges from 2-5 feet in most areas to as much as 20-30 feet in drift areas.

2.2 Ecological Description

The area is typically of the Upper Chihuahuan Desert Biome consisting primarily of sandy soil covered with short semi-arid grasses, interspersed with Honey Mesquite and forbs. Mammals represented include Orrd's and Merriam's Kangaroo Rats, Deer Mouse, White Throated Wood Rat, Cottontail Rabbit, Black Tailed Jackrabbit, Mule Deer, Bobcat, Red Fox and Coyote. Reptiles, amphibians and birds are numerous and typical of the area. A survey of Listed, Threatened or Endangered species was not conducted .

2.3 Area Groundwater

The unconfined groundwater aquifer at this site is projected to be <50-ft bgs based on water depth data obtained from the New Mexico State Engineers Office and the United States Geological Survey data base. However, groundwater was encountered approximately 31-feet bgs during the advancement of soil boring SB-5B (reference *Appendix III*). Groundwater gradient in this area is generally to the west-southwest.

2.4 Area Water Wells

There are no water supply wells located within a 1,000- foot radius of the release site (reference *Figure 2*).

2.5 Area Surface Water Features

There are no surface water bodies within a 1,000-foot radius of the release site (reference *Figure 2*).

3.0 NMOCD Site Ranking

Contaminant delineation and remedial work done at this site indicate chemical parameters of the soil and physical parameters of the groundwater were characterized consistent with the characterization and remediation/abatement goals and objectives set forth in the following New Mexico Oil Conservation Division (NMOCD) publications:

- ***Guidelines for Remediation of Leaks, Spills and Releases (August 13, 1993)***
- ***Unlined Surface Impoundment Closure Guidelines (February, 1993)***
- ***Pit and Below-Grade Tank Guidelines (November, 2004)***

Acceptable thresholds for contaminants/constituents of concern (CoC) were determined based on the NMOCD Ranking Criteria as follows:

- *Depth to Groundwater (i.e., distance from the lower most acceptable concentration to groundwater);*
- *Wellhead Protection Area (i.e., distance from fresh water supply wells);*
- *Distance to Surface Water Body (i.e., horizontal distance to all down gradient surface water bodies).*

Based on the proximity of the site to protectable area water wells, surface water bodies, and depth to groundwater from the lower most contamination, the NMOCD ranking score for the site is 20 points with the soil remedial goals highlighted in the Site Ranking table presented below:

1. Groundwater	**2. Wellhead Protection Area**	**3. Distance to Surface Water**
Depth to GW <50 feet: 20 points	**If <1,000' from water source, or; <200' from private domestic water source: *20 points***	**<200 horizontal feet: *20 points***
Depth to GW 50 to 99 feet: *10 points*		**200-1,000 horizontal feet: *10 points***
Depth to GW >100 feet: 0 points	**If >1,000' from water source, or; >200' from private domestic water source: *0 points***	**>1,000 horizontal feet: *0 points***
Site Rank (1+2+3) = 20 + 0 + 0 = 20 points		

Total Site Ranking Score and Acceptable Remedial Goal Concentrations			
Parameter	**20 or >**	10	0
Benzene[1]	**10 ppm**	10 ppm	10 ppm
BTEX[1]	**50 ppm**	50 ppm	50 ppm
TPH	**100 ppm**	1,000 ppm	5,000 ppm

[1] A field soil vapor headspace measurement of 100 ppm was substituted for laboratory analyses of the Benzene and BTEX concentration limits.

4.0 Subsurface Soil Investigation

Excavation of pit contents commenced on July 13, 2005 and continued through July 22, 2005. Approximately 1,666 cubic yards of drilling mud were excavated and disposed of at Sundance Services, Inc., of Eunice, New Mexico.

On July 22, 2005, five (5) sample points (reference *Figure 4*) were excavated beneath the pit floor with grab samples collected at various depths. A portion of each randomly selected sample was placed in laboratory provided containers and submitted to an independent laboratory for analyses of chloride concentrations. The remaining portion was analyzed in the field for chloride concentrations utilizing a LaMotte Chloride Test Kit. Field analyses indicated chloride concentrations ranged from 240 mg/Kg at 16-feet bgs in sample point SP-1 to 5,280 mg/Kg at 14-feet bgs in sample point SP-3(reference *Table 1*).

Laboratory analytical data for the samples collected from the sample points indicated chloride concentrations ranged from 112 mg/Kg at 16-feet bgs to 4,319 mg/Kg at 10-feet bgs in sample point SP-4 (reference *Table 1*).

On October 3 through October 4, 2005, the vertical extent of contamination from the drill pit materials was further determined via four (4) soil borings (reference *Figure 5*) advanced to different depths in the same location as the previous sample points in the pit floor (reference *Figure 4*). During the advancement of the soil borings, soil samples were collected at 26- and 31-feet bgs with a portion of each sample being submitted for laboratory analyses. The remaining portion of each sample was analyzed in the field for organic vapor and chloride concentrations. Field analyses indicated organic vapor concentrations ranged from 0.2 ppm to 6.3 ppm and chloride concentrations ranged from 240 mg/Kg to 800 mg/Kg (reference *Table 1*).

Laboratory analytical data for the soil sample collected from the four (4) soil borings indicated TPH constituent concentrations in SB-1B of 126 mg/Kg at 26-feet bgs and 21 mg/Kg at 31-feet bgs. TPH constituent concentrations in the remaining three (3) soil borings were non-detectable at or above laboratory method detection limits (MDL). Reported chloride concentrations for soil samples collected from the four (4) soil borings ranged from 64 mg/Kg in SB-1B at 26-feet bgs to 976 mg/Kg in SB-5B at 26-feet bgs (reference *Table 1*).

5.0 Groundwater Investigation

Groundwater was encountered approximately 31-feet bgs during the advancement of the soil borings. Most of the soil impacted above the NMOCD remedial thresholds for TPH constituents have been removed from the pit and disposed at Sundance Services, Inc. of Eunice, New Mexico.

Confirmatory laboratory analytical results for soil samples collected during the advancement of the soil borings indicated TPH constituents were detectable in one soil boring (SB-1B), but were non-detectable at or above laboratory MDL in the other three (3) soil borings (reference *Table 1 and Appendix I*).

Laboratory analytical results for the soil samples collected the during the advancement of the soil borings indicated chloride concentrations ranged from 64 mg/Kg to 976 mg/Kg in the four (4) soil borings (reference *Table 1& Appendix I*).

6.0 Remediation Process

Excavation of the drilling pit contents commenced on July 13, 2005 and continued through July 22, 2005. Approximately 1,666 cubic yards of drilling mud were disposed of at Sundance Services, Inc. With the exception of SB-1B, laboratory analytical data indicated hydrocarbon concentrations from bottom of the excavation (±8-feet bgs) to 31-feet bgs were non-detectable at or above laboratory MDL.

FIGURES

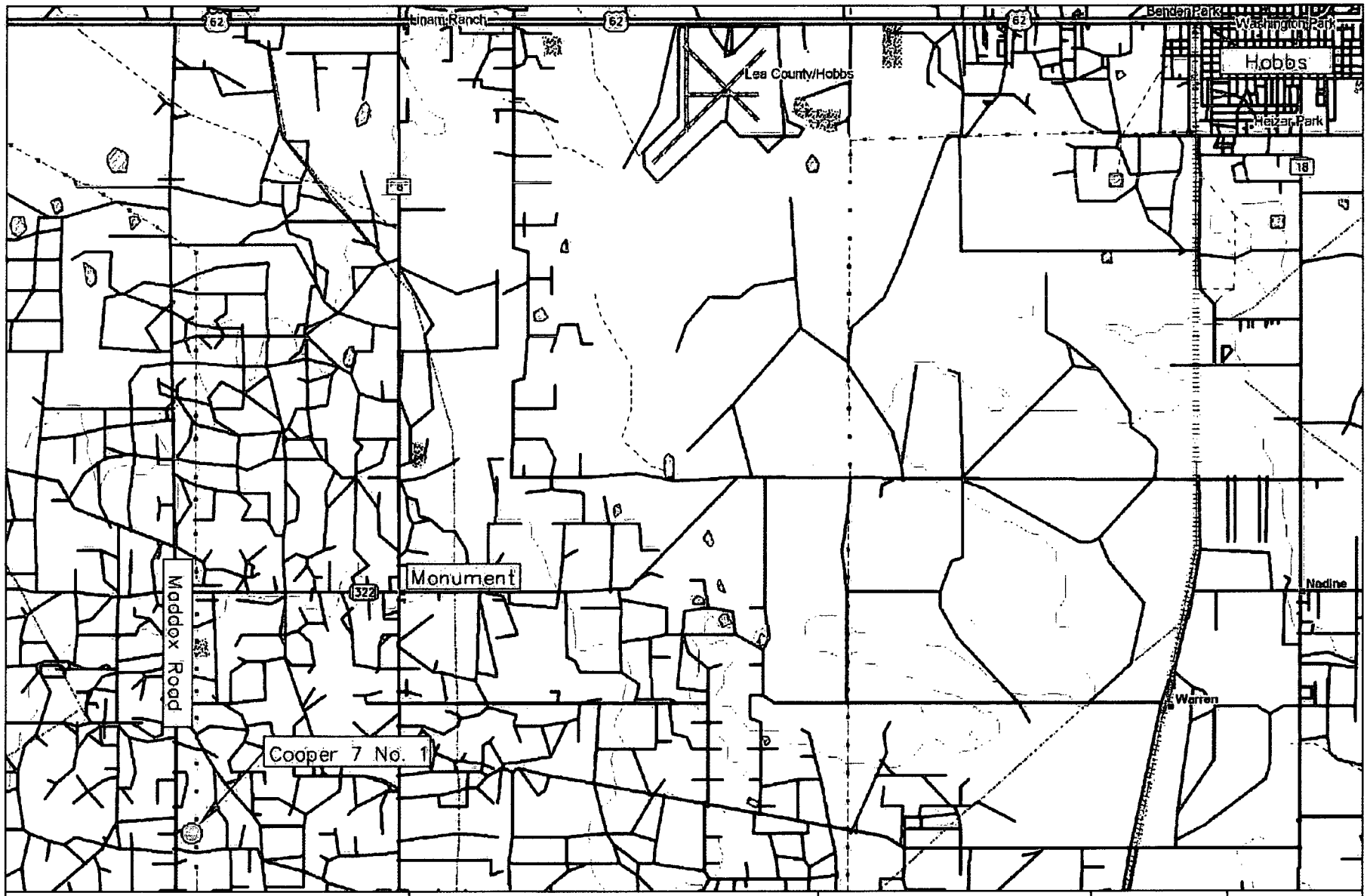
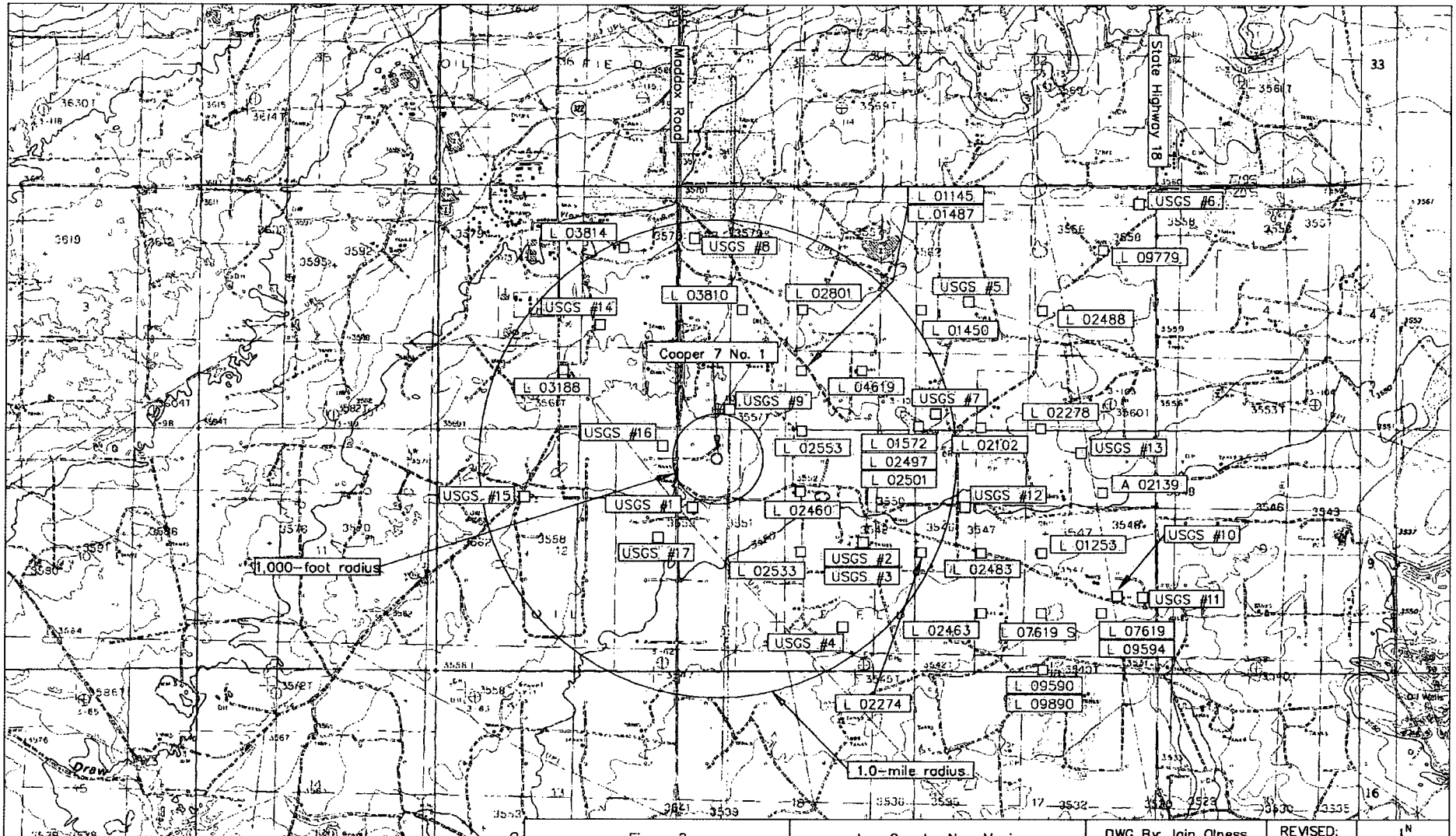


Figure 1 Area Map Chesapeake Energy Cooper 7 No. 1	Lea County, New Mexico NW 1/4 of the NW 1/4, Sec. 07, T20S, R37E N 32° 35' 35.6" W 103° 17' 47.1" Elevation: 3,557 feet amsl	DWG By: Iain Olness July 2005	REVISED:	N
		0 1.5 3.0 Miles	SHEET 1 of 1	


Maddox Road
State Highway 18
L 01145
L 01487
USGS #6
L 03814
USGS #8
L 09779
L 03810
L 02801
USGS #5
USGS #14
L 01450
L 02488
Cooper 7 No. 1
L 03188
L 04619
USGS #9
USGS #7
L 02278
USGS #16
L 02553
L 01572
L 02497
L 02501
L 02102
USGS #13
A 02139
USGS #15
USGS #1
L 02460
USGS #12
USGS #10
L 01253
USGS #17
USGS #2
USGS #3
L 02533
L 02483
1,000-foot radius
USGS #11
L 02463
L 07619 S
L 07619
L 09594
USGS #4
L 09590
L 09890
L 02274
1.0-mile radius
Draw
Figure 2
Site and Well Location Map
Chesapeake Energy
Cooper 7 No. 1
Lea County, New Mexico
NW 1/4 of the NW 1/4, Sec. 07, T20S, R37E
N 32° 35' 35.6" W 103° 17' 47.1"
Elevation: 3,557 feet amsl
DWG By: Iain Olness
July 2005
REVISED:
0
2,000
4,000
Feet
SHEET
1 of 1
N

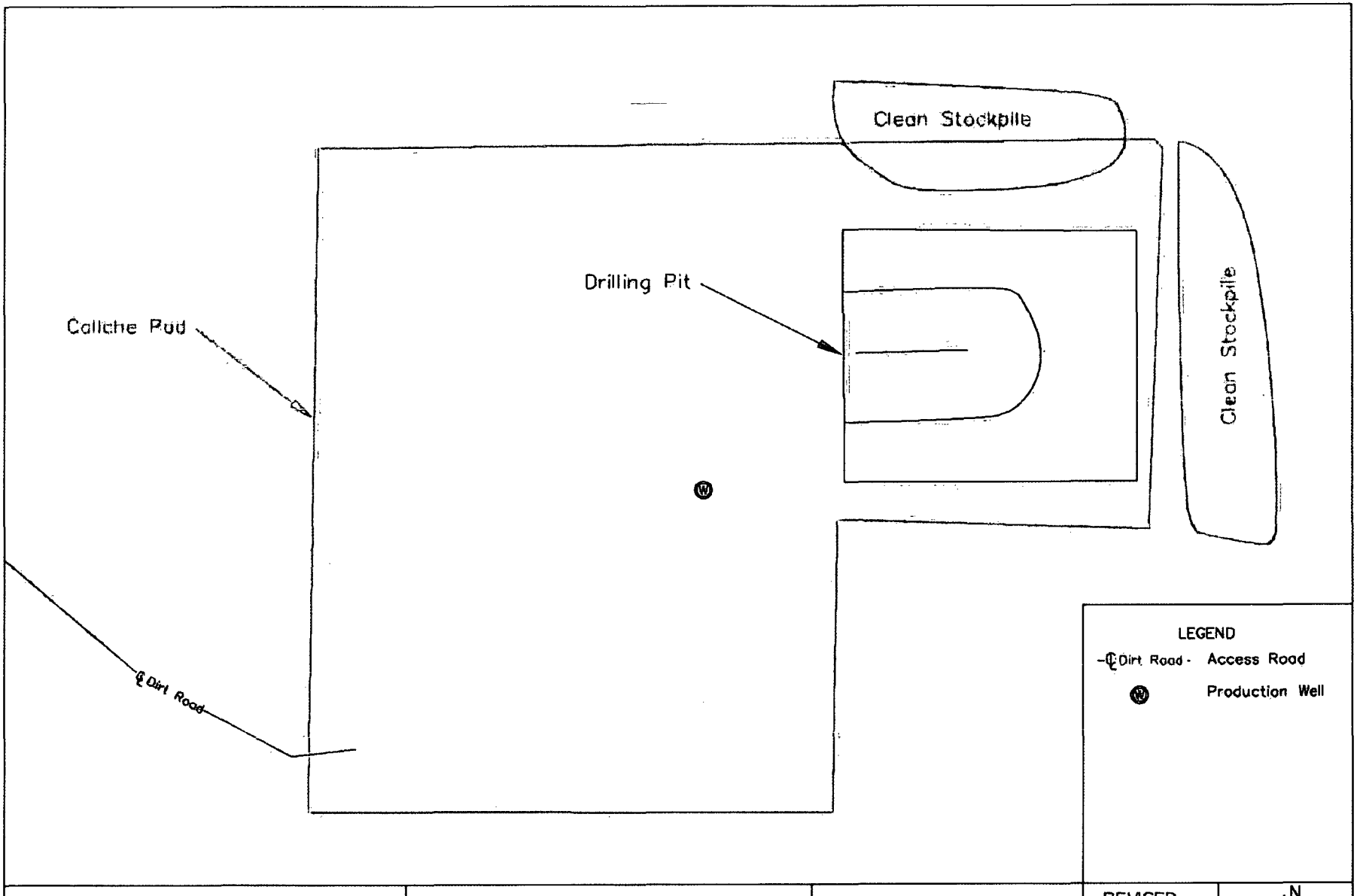


Figure 3 Site Map Chesapeake Energy Cooper 7 No. 1	Lea County, New Mexico NW 1/4 of the NW 1/4, Sec. 07, T220, R37E N 32° 35' 35.6" W 103° 17' 47.1" Elevation: 3,557 feet amsl	DWG By: Iain Olness July 2005 0 60 120 Feet	REVISED: SHEET 1 of 1	N

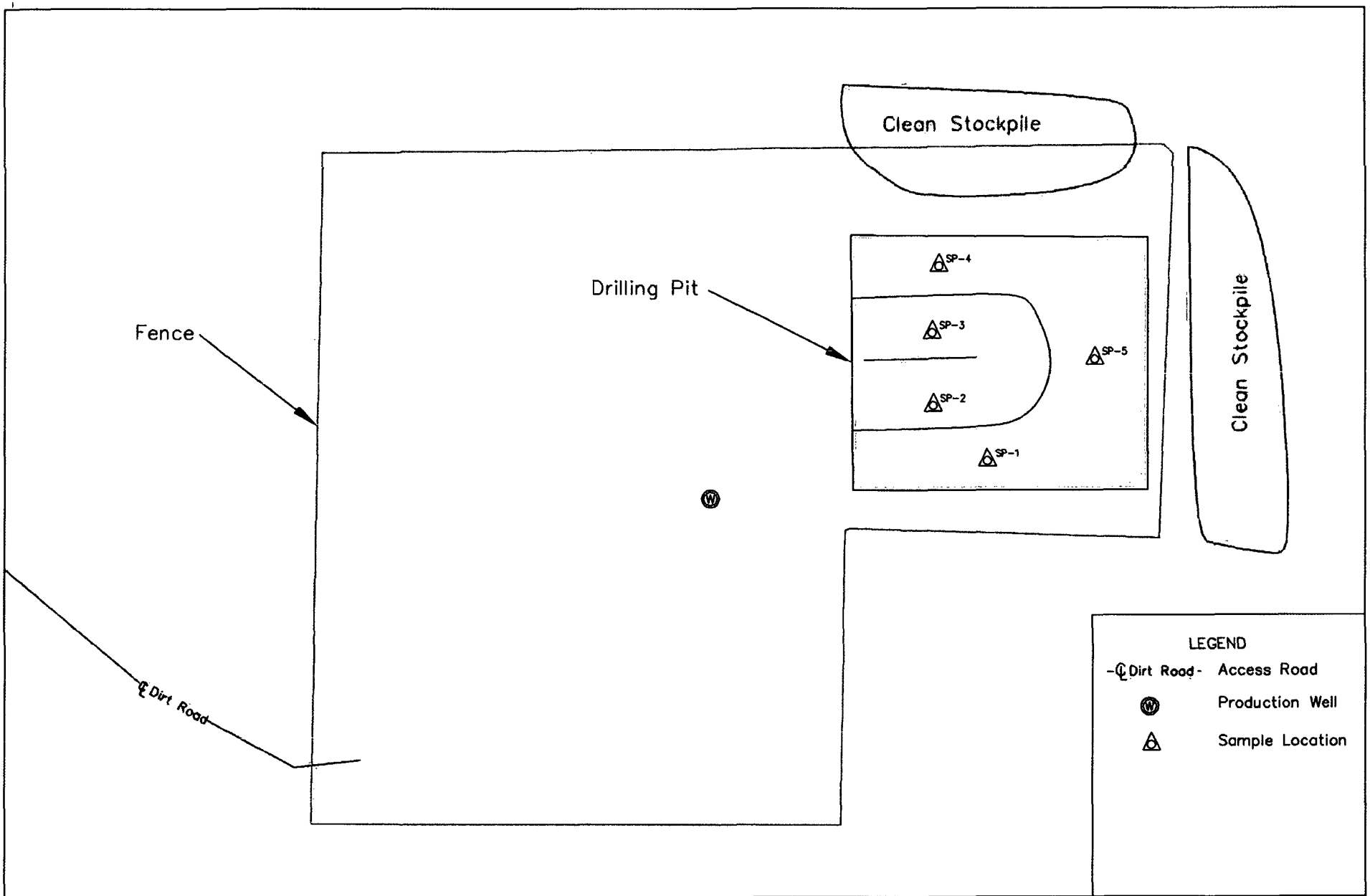


Figure 4 Excavation and Final Sample Location Map Chesapeake Energy Cooper 7 No. 1	Lea County, New Mexico NW 1/4 of the NW 1/4, Sec. 07, T220, R37E N 32° 35' 35.6" W 103° 17' 47.1" Elevation: 3,557 feet amsl	DWG By: Iain Olness July 2005	REVISED: Nov 2005	N
		0 60 120 Feet	SHEET 1 of 1	

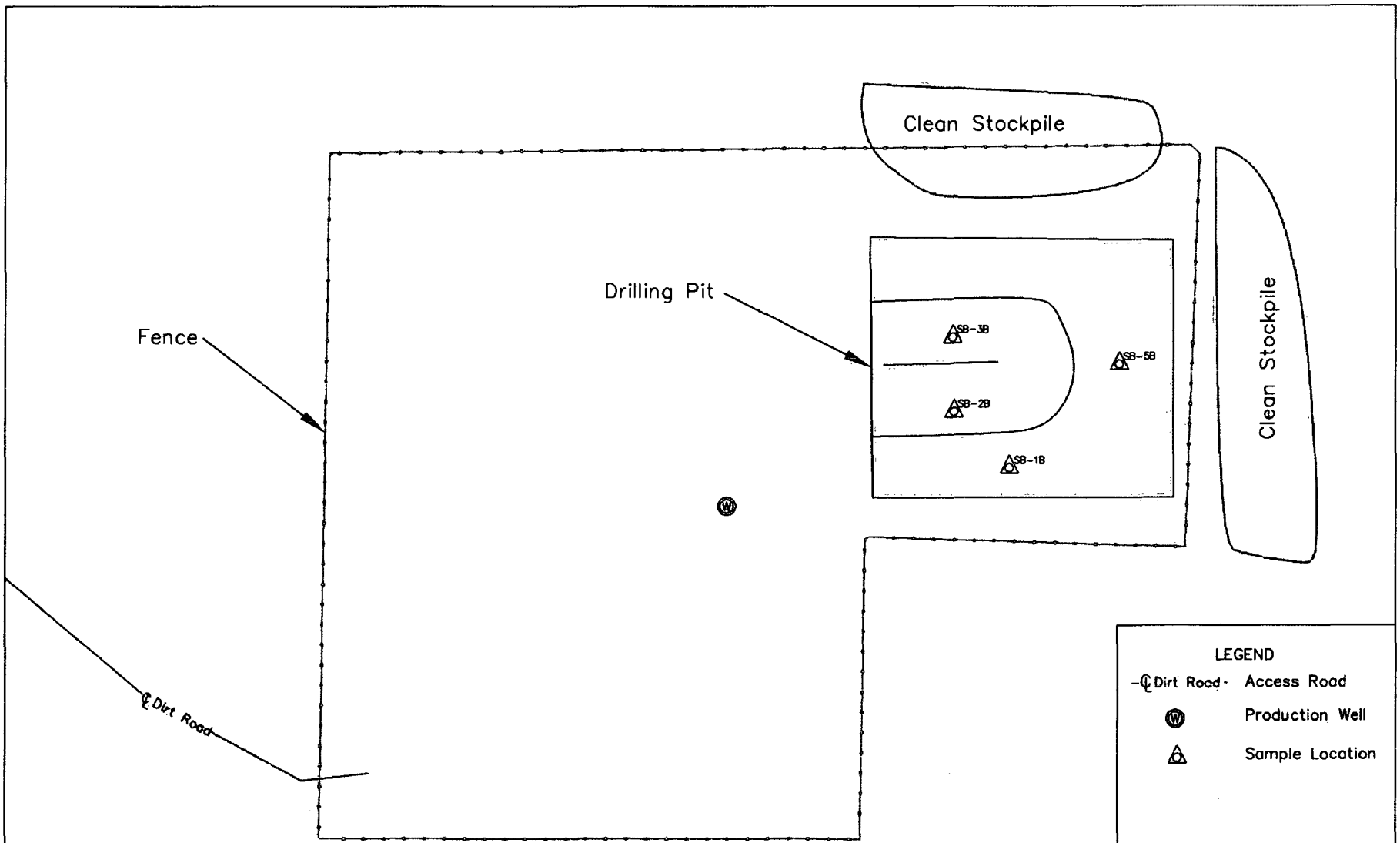


Figure 5 Soil Boring Location Map Chesapeake Energy Cooper 7 No. 1	Lea County, New Mexico NW 1/4 of the NW 1/4, Sec. 07, T20S, R37E N 32° 35' 35.6" W 103° 17' 47.1" Elevation: 3,557 feet amsl	DWG By: Iain Olness July 2005 0 60 120 Feet	REVISED: Nov 2005 SHEET 1 of 1	N

TABLES

TABLE 1

Summary of Soil Boring Soil Sample Laboratory Analytical Results

Chesapeake Energy - Cooper 7 No. 1 (Ref.# 160014)

Sample I.D.	Depth (feet)	Sample Date	PID Field Analysis (ppm)	Field Chloride Analyses (mg/Kg)	Benzene (mg/Kg)	Total BTEX (mg/Kg)	TPH (as Diesel) (mg/Kg)	TPH (as gasoline) (mg/Kg)	Total TPH (mg/Kg)	Chloride (mg/Kg)
SP-1	10	22-Jul-05	--	1,400	--	--	--	--	--	**1,280**
	12	22-Jul-05	--	1,600	--	--	--	--	--	--
	14	22-Jul-05	--	560	--	--	--	--	--	--
	16	22-Jul-05	--	250	--	--	--	--	--	--
	18	22-Jul-05	--	640	--	--	--	--	--	**992**
	20	22-Jul-05	--	1,020	--	--	--	--	--	--
	22	22-Jul-05	--	800	--	--	--	--	--	--
	24	22-Jul-05	--	560	--	--	--	--	--	**464**
SP-2	10	22-Jul-05	--	1,060	--	--	--	--	--	**864**
	12	22-Jul-05	--	880	--	--	--	--	--	--
	14	22-Jul-05	--	880	--	--	--	--	--	--
	16	22-Jul-05	--	1,060	--	--	--	--	--	**992**
	18	22-Jul-05	--	1,200	--	--	--	--	--	--
	20	22-Jan-05	--	780	--	--	--	--	--	--
	22	22-Jul-05	--	2,020	--	--	--	--	--	-
	24	22-Jul-05	--	660	--	--	--	--	--	**720**
SP-3	10	22-Jul-05	--	1,920	--	--	--	--	--	**2,351**
	12	22-Jul-05	--	1,540	--	--	--	--	--	--
	14	22-Jul-05	--	5,280	--	--	--	--	--	--
	16	22-Jul-05	--	2,500	--	--	--	--	--	**3,199**
	18	22-Jul-05	--	1,040	--	--	--	--	--	--
	20	22-Jul-05	--	1,120	--	--	--	--	--	--
	14	22-Jul-05	--	680	--	--	--	--	--	--
	24	22-Jul-05		640	--	--	--	--	--	**544**
SP-4	10	22-Jul-05	--	1,760	--	--	--	--	--	**4,319**
	12	22-Jul-05	--	320	--	--	--	--	--	--
	14	22-Jul-05	--	250	--	--	--	--	--	128
	16	22-Jul-05	--	250	--	--	--	--	--	112
SP-5	10	22-Jul-05	--	3,160	--	--	--	--	--	**3,039**
	12	22-Jul-05	--	2,000	--	--	--	--	--	--
	14	22-Jul-05	--	2,120	--	--	--	--	--	--
	16	22-Jul-05	--	2,480	--	--	--	--	--	**4,159**
	18	22-Jul-05	--	1,940	--	--	--	--	--	--
	20	22-Jul-05	--	1,460	--	--	--	--	--	--
	22	22-Jul-05	--	640	--	--	--	--	--	--
	24	22-Jul-05	--	420	--	--	--	--	--	**384**
SB-1B	26	03-Oct-05	4.2	240	-- [A]	-- [A]	126	<10.0	126	64
	31	03-Oct-05	2.2	320	-- [A]	-- [A]	21	<10.0	21	96
SB-2B	26	04-Oct-05	0.5	240	-- [A]	-- [A]	<10.0	<10.0	<10.0	144
	31	04-Oct-05	0.2	400	-- [A]	-- [A]	<10.0	<10.0	<10.0	**368**
SB-3B	26	04-Oct-05	3.5	720	-- [A]	-- [A]	<10.0	<10.0	<10.0	**672**
	31	04-Oct-05	6.3	480	-- [A]	-- [A]	<10.0	<10.0	<10.0	**432**
SB-5B	26	03-Oct-05	2.5	800	-- [A]	-- [A]	<10.0	<10.0	<10.0	**976**
	31	03-Oct-05	5.4	800	-- [A]	-- [A]	<10.0	<10.0	<10.0	**656**
NMOCD Remedial Thresholds					**10**	**50**			**100**	**250** [2]

Bolded *values are in excess of NMOCD Remediation Thresholds*

[A] *A field soil vapor headspace measurement of 100 ppm was substituted for laboratory analyses of the Benzene and BTEX concentrations limits*

[1] *Estimated concentration;analyte dectected below method detection limits*

[2] *Chloride residuals may not be capable of impacting local groundwater above the NMWQCC standards of 250 mg/L.*

-- Not Analyzed

TABLE 2

Well Data

Chesapeake Energy Cooper 7 No.1 (Ref. #160014)

Well Number	Diversion[A]	Owner	Use	Twsp	Rng	Sec q q q	Latitude	Longitude	Date Measured	Well Depth (ft bgs)	Depth to Water (ft bgs)
L 02460	3	Moran Drilling Co.	PRO	20 S	37 E	07 2 1	N 32° 35' 28.41"	W 103° 17' 25.25"	09-Jan-54	82	38
L 02533	0	Moran Drilling Co.	PRO	20 S	37 E	07 2 3	N 32° 35' 15.33"	W 103° 17' 25.23"	24-Apr-54	82	34
USGS #1				20 S	37 E	07 1 3 1			10-Apr-68		27.04
USGS #2				20 S	37 E	07 2 4 3			29-Jan-91		25.06
USGS #3				20 S	37 E	07 2 4 3			29-Mar-54		26.37
USGS #4				20 S	37 E	07 4 3 2			10-Apr-68		26.44
L 01450	3	Ohio Oil Co.	PRO	20 S	37 E	05 1 3	N 32° 36' 7.65"	W 103° 16' 54.36"			
L 01572	3	Exploration Drilling Co.	PRO	20 S	37 E	05 3 3 1	N 32° 35' 41.47"	W 103° 16' 54.37"	16-Sep-52	70	
L 02102	3	E. F. Moran, Inc.	PRO	20 S	37 E	05 3 4	N 32° 35' 41.43"	W 103° 16' 38.9"	20-Mar-53	70	46
L 02278	3	Laughlin Estate	DOM	20 S	37 E	05 4 3	N 32° 35' 41.39"	W 103° 16' 23.43"	01-Feb-61	65	37
L 02488	3	The Texas Co.	PRO	20 S	37 E	05 2 3	N 32° 36' 7.57"	W 103° 16' 23.45"	03-Feb-54	63	32
L 02497	3	Amerada Petroleum Corp.	PRO	20 S	37 E	05 3 3 3	N 32° 35' 41.47"	W 103° 16' 54.37"	10-Mar-54		35
L 02501	3	Amerada Petroleum Corp.	PRO	20 S	37 E	05 3 3 3	N 32° 35' 41.47"	W 103° 16' 54.37"			
L 09779	3	Dolores Nash Davis	DOM	20 S	37 E	05 2 2 2	N 32° 36' 20.62"	W 103° 16' 8.01"	15-Jan-85	50	40
USGS #5				20 S	37 E	05 1 3 4			14-Mar-06		30.75
USGS #6				20 S	37 E	05 2 2 2			30-Jan-76		26.82
USGS #7				20 S	37 E	05 3 3 3			10-Apr-68		30.2
L 01145	3	Gulf Oil Corporation	PRO	20 S	37 E	06 4 1 4	N 32° 35' 54.6"	W 103° 17' 25.25"	01-May-37	75	35
L 01487	3	Gulf Oil Corporation	PRO	20 S	37 E	06 4 1 4	N 32° 35' 54.6"	W 103° 17' 25.25"			
L 02553	3	Gulf Oil Corporation	PRO	20 S	37 E	06 4 3 4	N 32° 35' 41.49"	W 103° 17' 25.26"	13-May-54	85	40
L 02801	3	Amerada Petroleum Corp.	PRO	20 S	37 E	06 2 3 3	N 32° 36' 7.7"	W 103° 17' 25.24"			
L 03810	3	The Texas Co.	PRO	20 S	37 E	06 1 4 4	N 32° 36' 7.72"	W 103° 17' 40.67"	09-Mar-58	86	37
L 04619	3	Gulf Oil Corporation	PRO	20 S	37 E	06 4 2 3	N 32° 35' 54.58"	W 103° 17' 9.81"	29-Mar-61	86	36
USGS #8				20 S	37 E	06 1 1 3			12-Feb-81		22.94
USGS #9				20 S	37 E	06 3 3 4			23-Jan-96		28.81
L 01253	3	Gulf Oil Corporation	PRO	20 S	37 E	08 2 3 1	N 32° 35' 15.21"	W 103° 16' 23.42"			
A 02139	3	Gackle Drilling Co.	PRO	20 S	37 E	08 2 2 2	N 32° 35' 28.26"	W 103° 16' 7.95"	19-Mar-53	80	38
L 02274	3	Sinclair Oil & Gas Co.	PRO	20 S	37 E	08 1 3	N 32° 35' 15.28"	W 103° 16' 54.35"	05-Jul-53	70	38
L 02463	3	Amerada Petroleum Corp.	PRO	20 S	37 E	08 3 2 1	N 32° 35' 2.16"	W 103° 16' 38.87"	22-Jan-54	86	30
L 02483	3	Moran Drilling Co.	PRO	20 S	37 E	08 1 4 4	N 32° 35' 15.25"	W 103° 16' 38.88"	16-Feb-54	84	34
L 07619	15.57	Jim Cooper	IRR	20 S	37 E	08 4 2 2	N 32° 35' 2.08"	W 103° 16' 7.95"			
L 07619 S		Jim Cooper	IRR	20 S	37 E	08 4 1 1	N 32° 35' 2.12"	W 103° 16' 23.41"			
L 09590	3	Jimmy Cooper	DOM	20 S	37 E	08 4	N 32° 34' 49.04"	W 103° 16' 23.41"	03-Dec-84	70	35
L 09594	0	Jimmy Cooper	DOM	20 S	37 E	08 4 2	N 32° 35' 2.08"	W 103° 16' 7.95"			
L 09890	0	Jimmy Cooper	EXP	20 S	37 E	08 4	N 32° 34' 49.04"	W 103° 16' 23.41"	03-Dec-84	70	35
USGS #10				20 S	37 E	08 4 2 3			04-Feb-76		19.86
USGS #11				20 S	37 E	08 4 2 4			03-Mar-66		40.43
USGS #12				20 S	37 E	17 1 3 2			23-Jan-96		26.6

TABLE 2

Well Data

Chesapeake Energy Cooper 7 No.1 (Ref. #160014)

Well Number	Diversion[A]	Owner	Use	Twsp	Rng	Sec q q q	Latitude	Longitude	Date Measured	Well Depth (ft bgs)	Depth to Water (ft bgs)
USGS #13				20 S	37 E	18 2 1 2			29-Jan-91		27.28
L 03188	3	Amerada Petroleum Corp.	PRO	20 S	36 E	01 4 1 2	N 32° 35' 54.66"	W 103° 18' 26.59"			
L 03814	3	W. C. Byrd	DOM	20 S	36 E	01 2 2 2	N 32° 36' 20.84"	W 103° 18' 11.05"	04-Sep-58	60	40
USGS #14				20 S	36 E	01 4 1 2			11-Apr-68		26.28
USGS #15				20 S	36 E	12 1 4 1			11-Apr-68		29.65R
									27-Jan-71		28.25
USGS #16				20 S	36 E	12 2 2 2			08-Sep-67		27.72
USGS #17				20 S	36 E	12 2 4 4			01-Mar-61		25.65

* = Data obtained from the New Mexico Office of the State Engineer Website (http://iwaters.ose.state.nm.us:7001/iWATERS/wr_RegisServlet1) and a USGS Database on file at EPI's Office.
Well locations shown on Figure 2

[A] = in acre feet per annum
PRO = 72-12-1 Prospecting or Development of a Natural Resource
IRR = Irrigation
DOM = Domestic
EXP = Exploration
quarters are 1=NW, 2=NE, 3=SW, 4=SE; quarters are biggest to smallest

APPENDIX I

LABORATORY ANALYTICAL REPORTS
AND
CHAIN-OF-CUSTODY FORM

CARDINAL LABORATORIES

PHONE (325) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
ENVIRONMENTAL PLUS, INC.
ATTN: IAIN OLNESS
P.O. BOX 1558
EUNICE, NM 88231
FAX TO: (505) 394-2601

Receiving Date: 08/03/05
Reporting Date: 08/04/05
Project Owner: CHESAPEAKE ENERGY CORP.
Project Name: COOPER 7 NO. 1
Project Location: UL-D, SECT.7.T20S, R36E

Analysis Date: 08/03/05
Sampling Date: 07/22/05
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Cl^- (mg/Kg)
H10029-1	SP-1 (10')	1280
H10029-2	SP-1 (18')	992
H10029-3	SP-1 (24')	464
H10029-4	SP-2 (10')	864
H10029-5	SP-2 (16')	992
H10029-6	SP-2 (24')	720
H10029-7	SP-3 (10')	2351
H10029-8	SP-3 (16')	3199
H10029-9	SP-3 (24')	544
H10029-10	SP-4 (10')	4319
H10029-11	SP-4 (14')	128
H10029-12	SP-4 (16')	112
H10029-13	SP-5 (10')	3039
H10029-14	SP-5 (16')	4159
H10029-15	SP-5 (24')	384
Quality Control		1000
True Value QC		1000
% Recovery		100
Relative Percent Difference		2.0

METHOD: Standard Methods	4500-ClB

Note: Analyses performed on 1:4 w:v aqueous extracts.

Amy Hill
Chemist

8/4/05
Date

H10029

Cardinal Laboratories Inc.

Chain of Custody Form

101 East Marland, Hobbs, NM 88240
505-393-2326 Fax 505-393-2476

2111 Beechwood, Abilene, TX 79603
915-673-7001 Fax 915-673-7020

Company Name	Environmental Plus, Inc.
EPI Project Manager	Iain Olness
Mailing Address	P.O. BOX 1558
City, State, Zip	Eunice New Mexico 88231
EPI Phone#/Fax#	505-394-3481 / 505-394-2601
Client Company	Chesapeake Energy Corporation
Facility Name	Cooper 7 No. 1
Location	UL-D, Sect. 7. T 20 S, R 367E
Project Reference	160014
EPI Sampler Name	George Blackburn

Bill To

Attn: Iain Olness
PO Box 1558
Eunice, NM 88231

ANALYSIS REQUEST

LAB I.D.	SAMPLE I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUND WATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE	ICE/COOL	OTHER	SAMPLING: DATE	TIME	BTEX 8021B	TPH 8015M	CHLORIDES (Cl^-)	SULFATES (SO_4^{-2})	pH	TCLP	OTHER >>>	PAH			
H10029-1 1	SP-1 (10')	G	1			X					X		22-Jul-05	7:30			X								
-2 2	SP-1 (18')	G	1			X					X		22-Jul-05	8:10			X								
-3 3	SP-1 (24')	G	1			X					X		22-Jul-05	8:55			X								
-4 4	SP-2 (10')	G	1			X					X		22-Jul-05	9:15			X								
-5 5	SP-2 (16')	G	1			X					X		22-Jul-05	9:55			X								
-6 6	SP-2 (24')	G	1			X					X		22-Jul-05	10:40			X								
-7 7	SP-3 (10')	G	1			X					X		22-Jul-05	11:00			X								
-8 8	SP-3 (16')	G	1			X					X		22-Jul-05	11:40			X								
-9 9	SP-3 (24')	G	1			X					X		22-Jul-05	12:55			X								
-10 10	SP-4 (10')	G	1			X					X		22-Jul-05	13:20			X								

Sampler Relinquished:	Date	Received By:	E-mail results to: iolness@hotmail.com
Relinquished By:	Time		REMARKS:
	Date 9/3/05	Received By: (lab staff)	
Delivered by:	Time 10:30	Checked By:	
	Sample Cool & Intact: Yes (No)		

Cardinal Laboratories Inc.

Chain of Custody Form

101 East Marland, Hobbs, NM 88240
505-393-2326 Fax 505-393-2476

2111 Beechwood, Abilene, TX 79603
915-673-7001 Fax 915-673-7020

Company Name	Environmental Plus, Inc.
EPI Project Manager	Iain Olness
Mailing Address	P.O. BOX 1558
City, State, Zip	Eunice New Mexico 88231
EPI Phone#/Fax#	505-394-3481 / 505-394-2601
Client Company	Chesapeake Energy Corporation
Facility Name	Cooper 7 No. 1
Location	UL-D, Sect. 7. T 20 S, R 367E
Project Reference	160014
EPI Sampler Name	George Blackburn

Bill To

Attn: Iain Olness
PO Box 1558
Eunice, NM 88231

LAB I.D.		SAMPLE I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUND WATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE	ICE/COOL	OTHER	SAMPLING: DATE	TIME	ANALYSIS REQUEST: BTEX 8021B	TPH 8015M	CHLORIDES (Cl)	SULFATES (SO_4^{-2})	pH	TCLP	OTHER >>>	PAH			
H10029-11	1	SP-4 (14')	G	1			X					X		22-Jul-05	14:05			X							
-12	2	SP-4 (16')	G	1			X					X		22-Jul-05	14:35			X							
-13	3	SP-5 (8) 10'	G	1			X					X		22-Jul-05	15:00			X							
-14	4	SP-5 (16')	G	1			X					X		22-Jul-05	15:25			X							
-15	5	SP-5 (24')	G	1			X					X		22-Jul-05	15:50			X							
	6																								
	7																								
	8																								
	9																								
	10																								

Sampler Relinquished: [signature] Date: Time:

Relinquished by: [signature] Date: 7/3/05 Time:

Received By:

Received By: (lab staff) [signature]

Delivered by:

Sample Cool & Intact: Yes / No

Checked By:

E-mail results to: iolness@hotmail.com

REMARKS:

CARDINAL LABORATORIES

PHONE (325) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
ENVIRONMENTAL PLUS, INC.
ATTN: IAIN OLNESS
P.O. BOX 1558
EUNICE, NM 88231
FAX TO: (505) 394-2601

Receiving Date: 10/04/05
Reporting Date: 10/07/05
Project Number: 160014
Project Name: COOPER 7 NO.1
Project Location: UL-D, SECT.7. T 20 S, R 367E

Sampling Date: 10/03/05
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: NF
Analyzed By: BC/HM

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/Kg)	DRO (>C_{10}-C_{28}) (mg/Kg)	Cl* (mg/Kg)
ANALYSIS DATE		10/06/05	10/06/05	10/05/05
H10265-1	SB-1B (26')	<10.0	126	64
H10265-2	SB-1B (31')	<10.0	21.0	96
H10265-3	SB-2B (26')	<10.0	<10.0	144
H10265-4	SB-2B (31')	<10.0	<10.0	368
H10265-5	SB-3B (26')	<10.0	<10.0	672
H10265-6	SB-3B (31')	<10.0	<10.0	432
H10265-7	SB-5B (26')	<10.0	<10.0	976
H10265-8	SB-5B (31')	<10.0	<10.0	656
Quality Control		782	801	1030
True Value QC		800	800	1000
% Recovery		97.7	100	103
Relative Percent Difference		1.0	0.4	0.0

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl^-: Std. Methods 4500-Cl^-B
*Analyses performed on 1:4 w:v aqueous extracts.

Chemist

10/7/05
Date

H10265.XLS

Environmental Plus, Inc.

Chain of Custody Form

2100 Avenue O, Eunice, NM 88231 *P.O. Box 1558, Eunice, NM 88231*
(505) 394-3481 FAX: (505) 394-2601

Company Name	Environmental Plus, Inc.
EPI Project Manager	Iain Olness
Mailing Address	P.O. BOX 1558
City, State, Zip	Eunice New Mexico 88231
EPI Phone#/Fax#	505-394-3481 / 505-394-2601
Client Company	Chesapeake Energy Corporation
Facility Name	Cooper 7 No. 1
Location	UL-D, Sect. 7. T 20 S, R 367E
Project Reference	160014
EPI Sampler Name	George Blackburn

Bill To

Attn: Iain Olness
PO Box 1558
Eunice, NM 88231

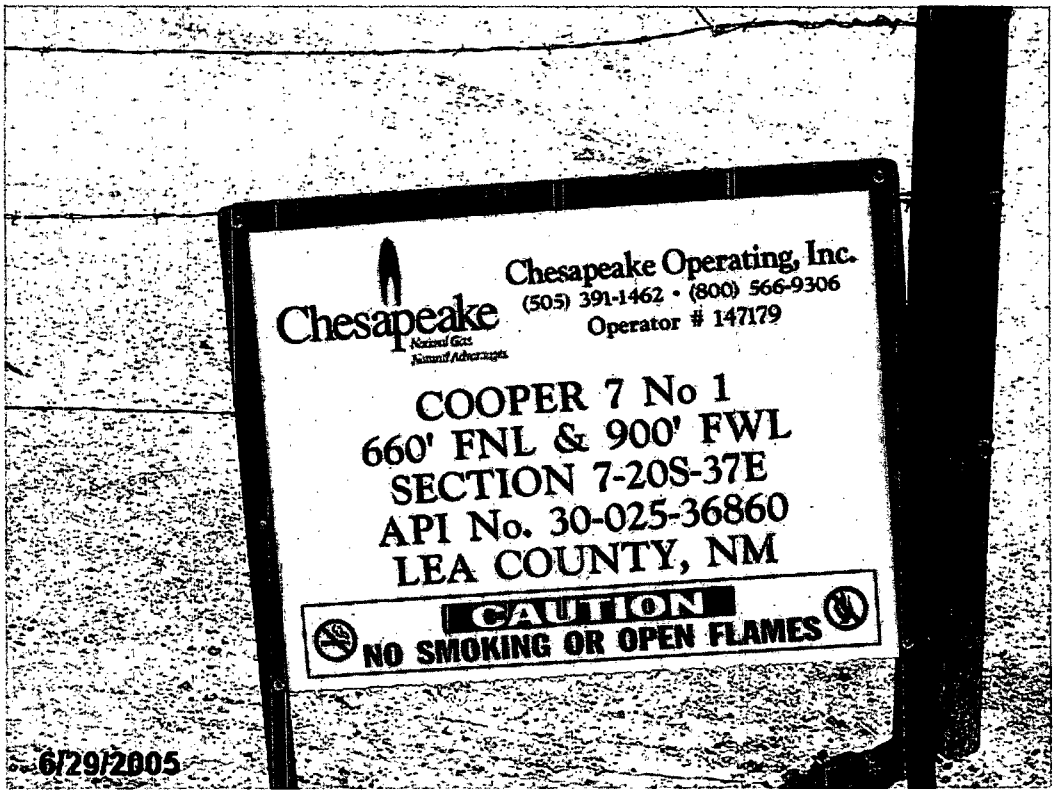
LAB I.D.	SAMPLE I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUND WATER	MATRIX: WASTEWATER	MATRIX: SOIL	MATRIX: CRUDE OIL	MATRIX: SLUDGE	MATRIX: OTHER:	PRESERV.: ACID/BASE	PRESERV.: ICE/COOL	PRESERV.: OTHER	SAMPLING: DATE	SAMPLING: TIME	ANALYSIS REQUEST: BTEX 8021B	TPH 8015M	CHLORIDES (Cl)	SULFATES (SO_4^{-2})	pH	TCLP	OTHER >>>	PAH			
H10265 - 1	1 SB-1B (26')	X	1			1							03-Oct-05	13:20		X	X								
-2	2 SB-1B (31')	X	1			1							03-Oct-05	14:00		X	X								
-3	3 SB-2B (26')	X	1			1							04-Oct-05	9:30		X	X								
-4	4 SB-2B (31')	X	1			1							04-Oct-05	10:30		X	X								
-5	5 SB-3B (26')	X	1			1							04-Oct-05	12:00		X	X								
-6	6 SB-3B (31')	X	1			1							04-Oct-05	13:00		X	X								
-7	7 SB-5B (26')	X	1			1							03-Oct-05	11:15		X	X								
-8	8 SB-5B (31')	X	1			1							03-Oct-05	12:00		X	X								
	9																								
	10																								

Sampler Relinquished:	Date Time	Received By:	E-mail results to: iolness@envplus.net REMARKS:
Relinquished by:	Date 10/4/05 Time 4:40 PM	Received By: (lab staff)	
Delivered by:	Sample Cool & Intact (Yes) No	Checked By:	

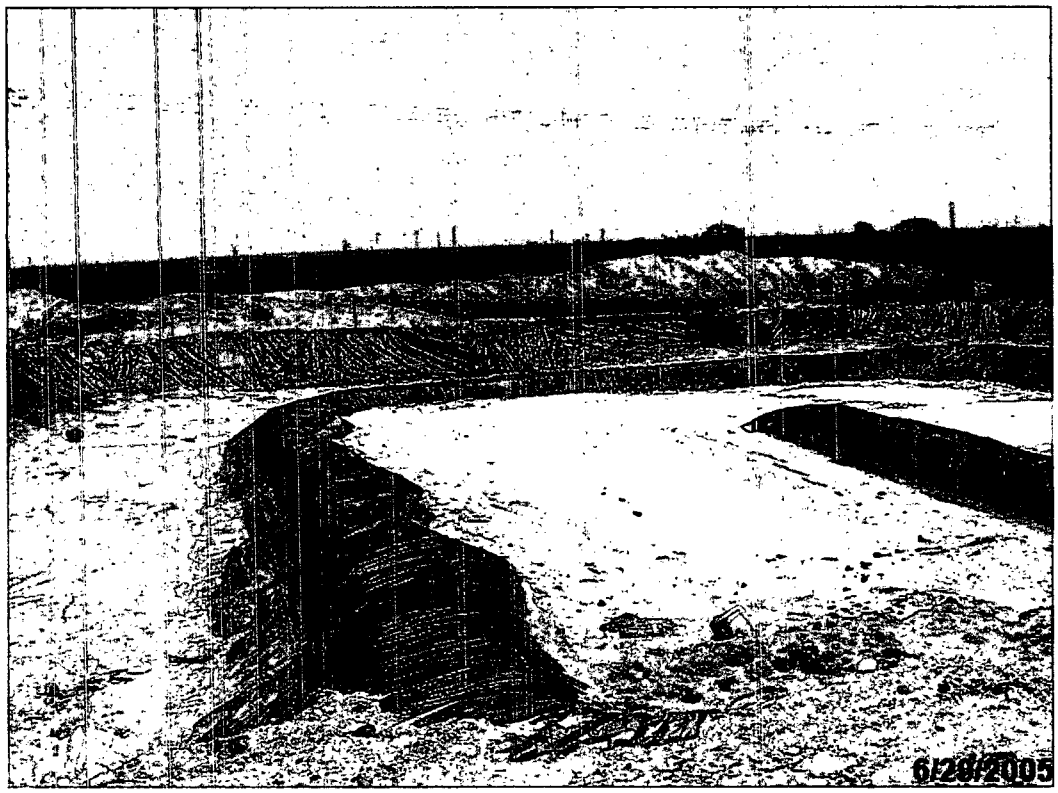
ANALYTICAL RESULTS NOT INCLUDED IN DRAFT COPY OF REPORT

APPENDIX II

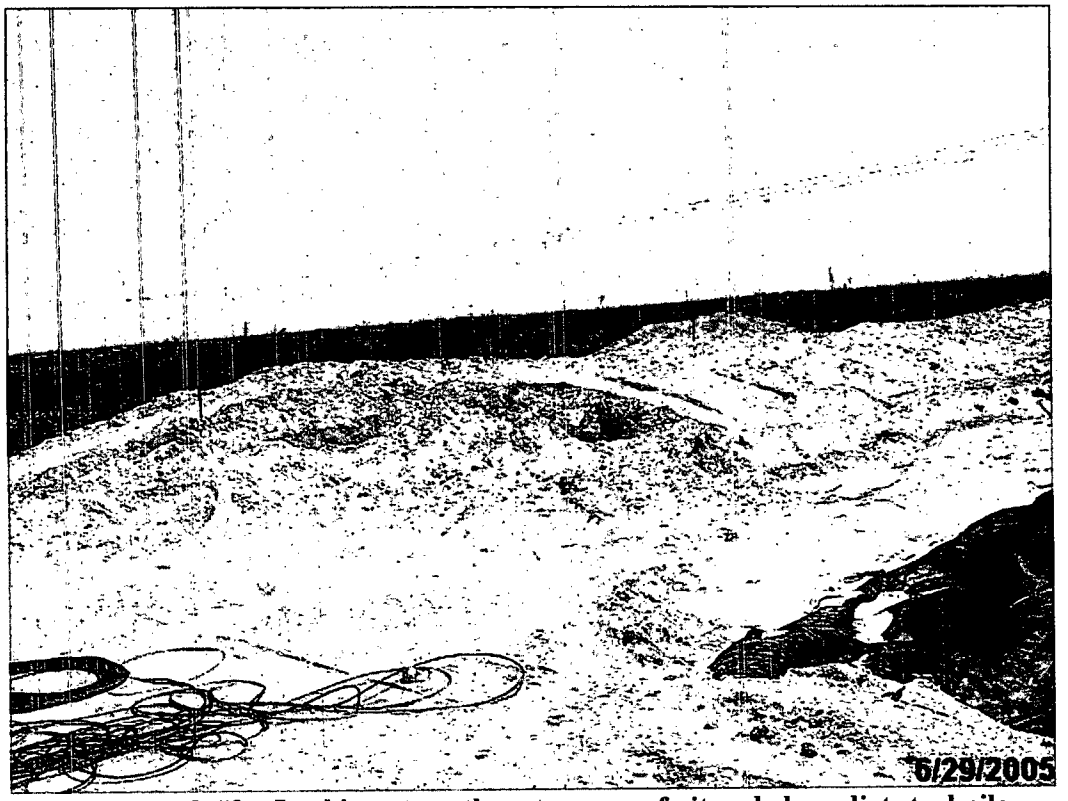
PROJECT PHOTOGRAPHS



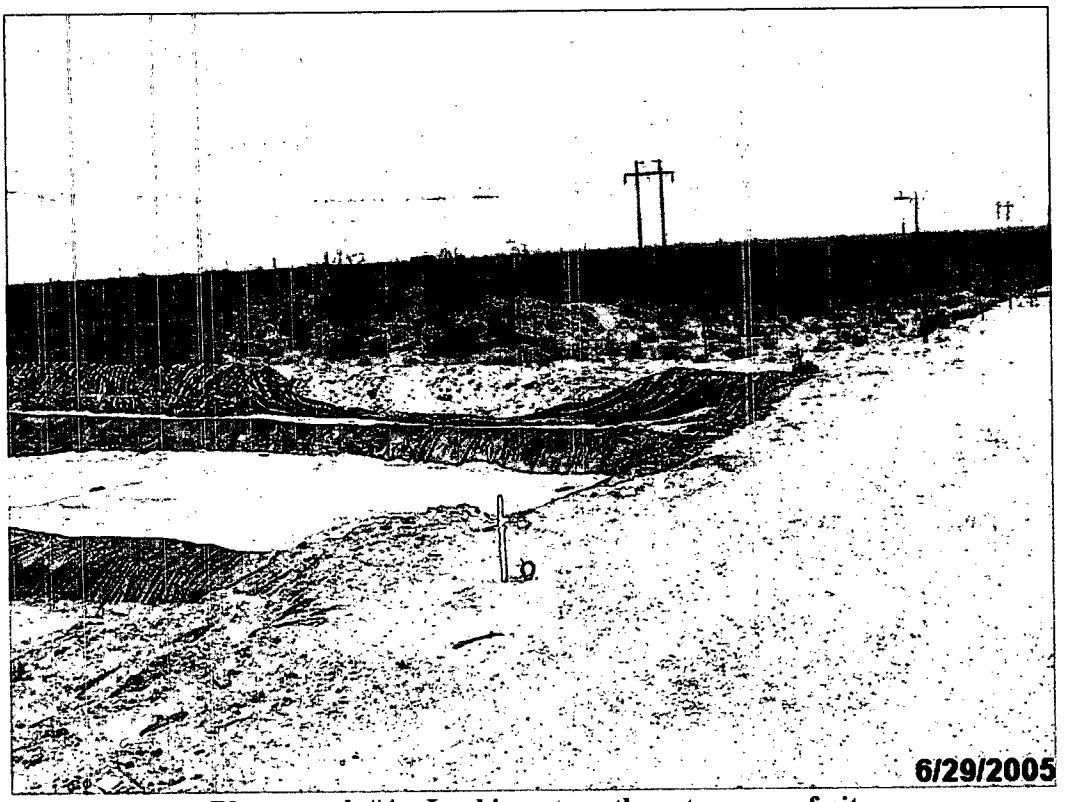
Photograph #1 – Lease Sign



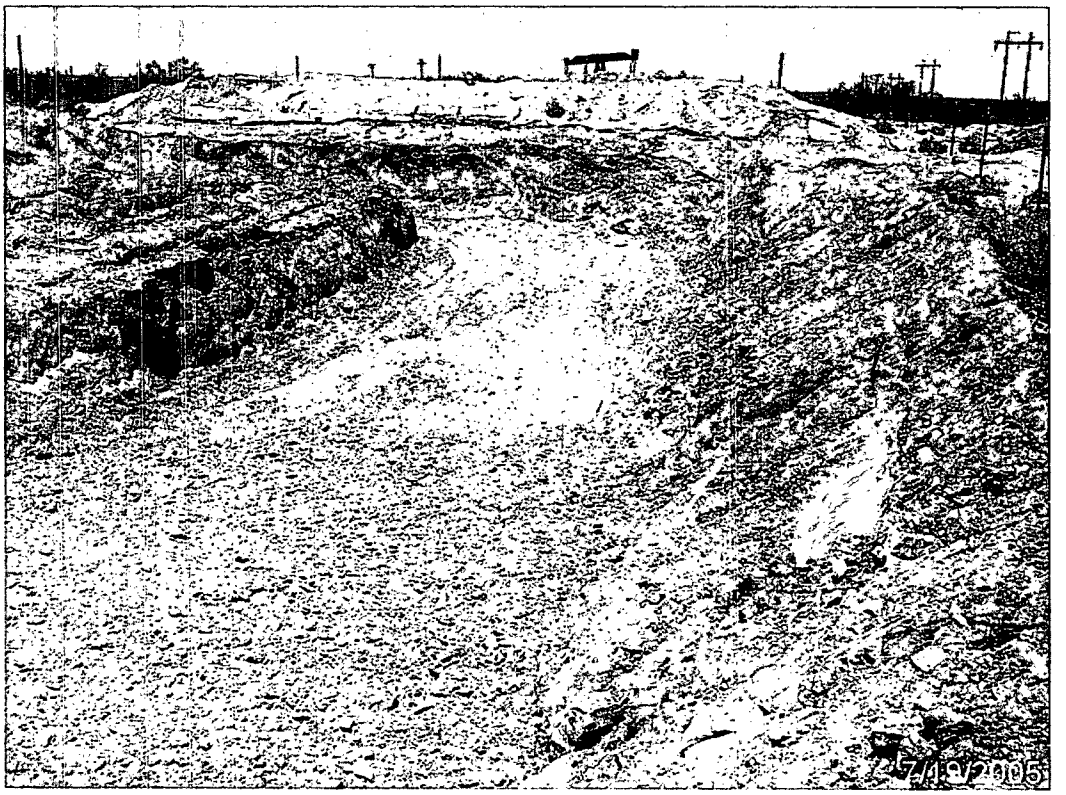
Photograph #2 – Looking east at drill pit, dividers and liner



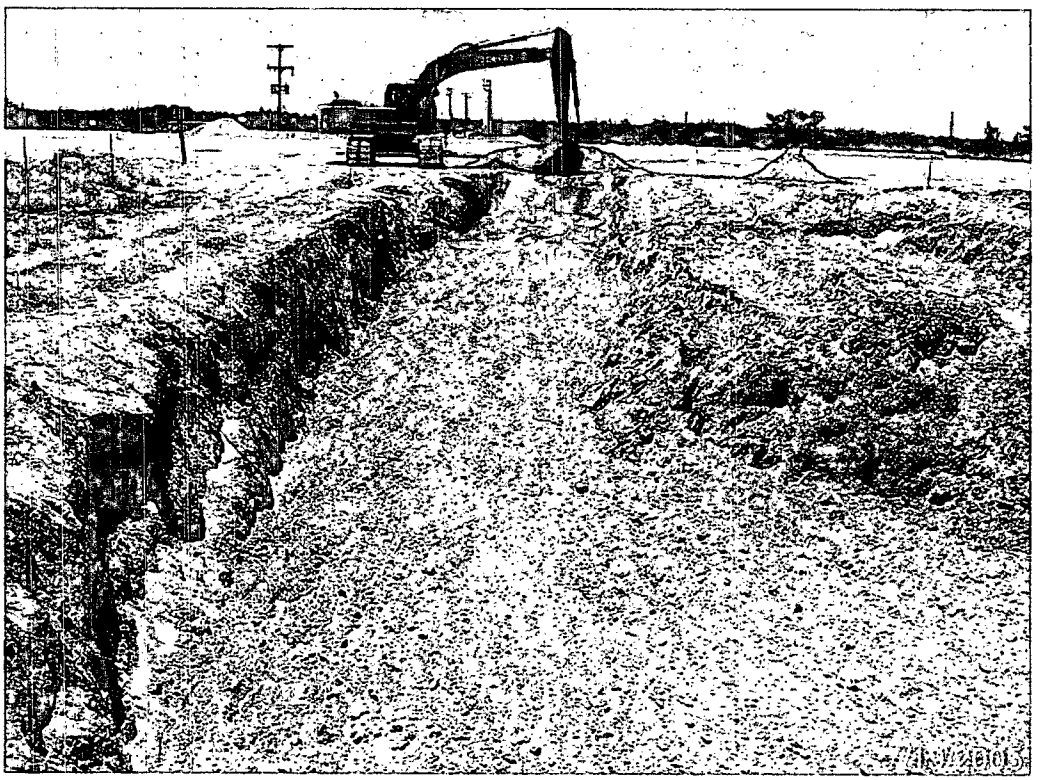
Photograph #3 – Looking at northwest corner of pit and clean dirt stockpile



Photograph #4 – Looking at southwest corner of pit

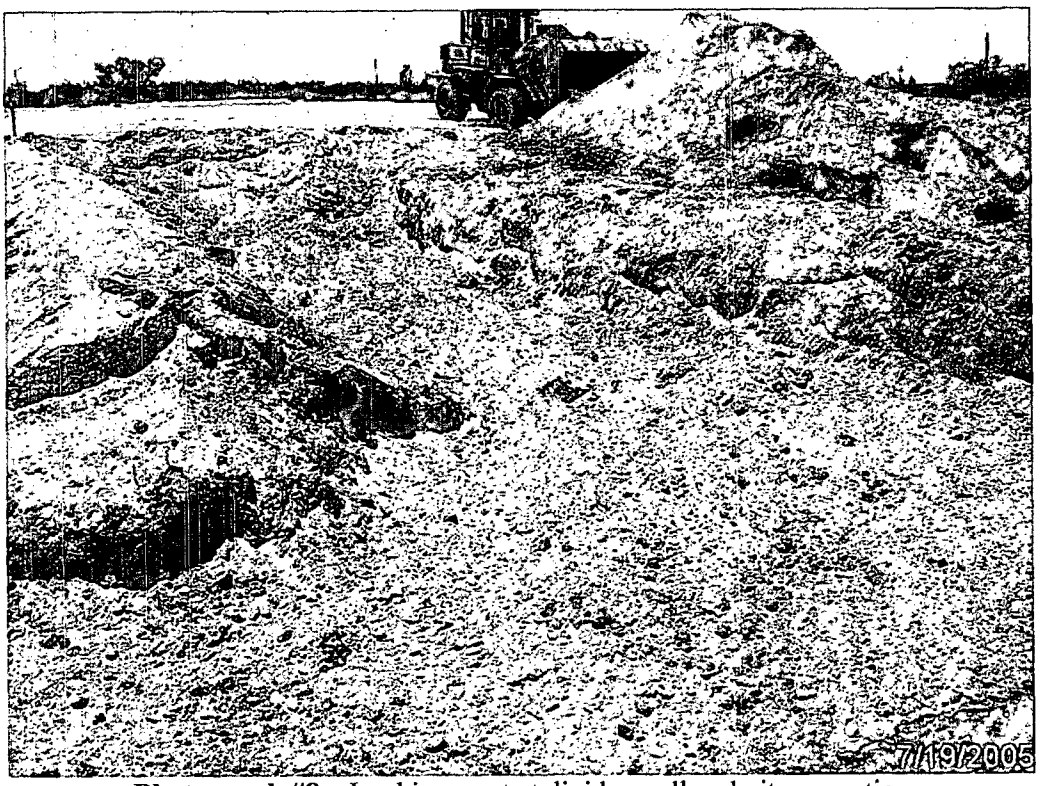


Photograph #5 – Looking northwest at pit excavation and clean soil stockpile



Photograph #6 – Looking west at pit excavation

Photograph # 7- Looking west at divider wall and pit excavation



Photograph #8 – Looking west at divider wall and pit excavation

APPENDIX III

Soil Boring Logs

Log Of Test Borings

(NOTE - Page 1 of 1)

ENVIRONMENTAL PLUS, INC.
STATE APPROVED LAND FARM AND ENVIRONMENTAL SERVICES
EUNICE
505-394-3481

Project Number: 160014
Project Name: Chesapeake Cooper 7 #1
Location: UL-D, Sec. 07, T20S, R37E-Lea County, New Mexico
Boring Number: SB-1B | Surface Elevation: 3,557

Start Date: 10-3-05 Time: 1240
Completion Date: 10-3-05 Time: 1430

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
							5	Drilling Pit
							10	CALICHE, White, Soft
							15	
							20	
1320	SS	6	Moist	4.2	--	SP	25	Red to White, Soft, SAND with some Trace Silt and Clay
1400	SS	6	Wet	2.2	--	SP	30	
								End of soil boring at 31'

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
10/3/05	1415	31	30	30	31
-	-	-	-	-	-

Drilling Method: HSA 3.5" ID
Backfill Method: Bentonite
Field Representative: GB

Log Of Test Borings

(NOTE - Page 1 of 1)

ENVIRONMENTAL PLUS, INC.
STATE APPROVED LAND FARM AND ENVIRONMENTAL SERVICES
EUNICE
505-394-3481

Project Number: 160014
Project Name: Chesapeake Cooper 7 #1
Location: UL-D, Sec. 07, T20S, R37E-Lea County, New Mexico
Boring Number: SB-2B
Surface Elevation: 3,557

Start Date: 10-4-05 Time: 0730
Completion Date: 10-4-05 Time: 1055

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
							5	Drilling Pit
							10	CALICHE, White, Soft
							15	
							20	
0930	SS	10	Moist	0.5	--	SP	25	Red to White, Soft, SAND with some Trace Silt and Clay
1030	SS	10	Wet	0.2	--	SP	30	End of soil boring at 31'

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
10/4/05	1035	31	30	30	31
-	-	-	-	-	-	

Drilling Method: HSA 3.5" ID
Backfill Method: Bentonite
Field Representative: GB

Log Of Test Borings

(NOTE - Page 1 of 1)

ENVIRONMENTAL PLUS, INC.
STATE APPROVED LAND FARM AND ENVIRONMENTAL SERVICES
EUNICE
505-394-3481

Project Number: 160014
Project Name: Chesapeake Cooper 7 #1
Location: UL-D, Sec. 07, T20S, R37E-Lea County, New Mexico
Boring Number: SB-3B | Surface Elevation: 3,557

Start Date: 10-4-05 Time: 1100
Completion Date: 10-4-05 Time: 1330

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
							5	Drilling Pit
							10	CALICHE, White, Soft
							15	
							20	
1200	SS	6	Moist	3.5	--	SP	25	Red to White, Soft, SAND with some Trace Silt and Clay
1300	SS	8	Wet	6.3	--	SP	30	
								End of soil boring at 31'

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
10/4/05	1310	31	30	30	31
-	-	-	-	-	-	

Drilling Method: HSA 3.5" ID
Backfill Method: Bentonite
Field Representative: GB

Log Of Test Borings

(NOTE - Page 1 of 1)

ENVIRONMENTAL PLUS, INC.
STATE APPROVED LAND FARM AND ENVIRONMENTAL SERVICES
EUNICE
505-394-3481

Project Number: 160014
Project Name: Chesapeake Cooper 7 #1
Location: UL-D, Sec. 07, T20S, R37E-Lea County, New Mexico
Boring Number: SB-5B | Surface Elevation: 3,557

Start Date: 10-3-05 Time: 0900
Completion Date: 10-3-05 Time: 1230

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (Feet)	Description
							5	Drilling Pit
							10	CALICHE, White, Soft
							15	
							20	
1115	SS	8	Moist	2.5	--	SP	25	Red to White, Soft, SAND with some Trace Silt and Clay
1200	SS	12	Water	5.4	--	SP	30	
								End of soil boring at 31'

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
10/3/05	1205	31	30	30	31
-	-	-	-	-	-	

Drilling Method: HSA 3.5" ID
Backfill Method: Bentonite
Field Representative: GB

APPENDIX IV

INFORMATIONAL COPY OF THE NMOCD C-103 FORM

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

	WELL API NO.: 30-025-36860
	5. Indicate Type of Lease STATE ☐ FEE ☒
	6. State Oil & Gas Lease No.:
SUNDRY NOTICES AND REPORTS ON WELLS. (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)	**7. Lease Name or Unit Agreement Name:** Cooper 7
1. Type of Well: Oil Well ☐ **Gas Well** ☒ **Other** ____	**8. Well Number:** No. 1
2. Name of Operator: Chesapeake Operating, Inc.	**9. OGRID Number:**
3. Address of Operator: 5014 Carlsbad Highway Hobbs, NM 88240	**10. Pool name or Wildcat**

4. Well Location
Unit Letter: D : 660 **feet from the** North **line and** 900 **feet from the** West **line**
Section: 7 **Township:** 20 South **Range** 37 East **NMPM** ____ **County** Lea

11. Elevation ***(Show whether DR, RKB, RT, GR, etc.)***
3,557 feet above mean sea level

Pit or Below-grade Tank Application ☐ or Closure ☒

Pit type: Drilling Depth to Groundwater: <50 feet Distance from nearest fresh water well: > 1,000 feet Distance from nearest surface water: > 1,000 feet

Pit Liner Thickness: 20 - mil Below-Grade Tank: Volume: ____ bbls; Construction Material: ____

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK ☐	PLUG AND ABANDON ☐	REMEDIAL WORK ☐	ALTERING CASING ☐
TEMPORARILY ABANDON ☐	CHANGE PLANS ☐	COMMENCE DRILLING OPNS. ☐	P AND A ☐
PULL OR ALTER CASING ☐	MULTIPLE COMPL ☐	CASING/CEMENT JOB ☐	
OTHER: ____ ☐		OTHER: Pit Closure ☒	

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Chesapeake Operating, Inc. (Chesapeake) is conducting the pit closure according to NMOCD guidelines. As the depth to groundwater is < 50 feet below ground surface (bgs), Chesapeake is removing all contents from the pit and disposing of them at Sundance Services, Inc. In addition, a minimum of six (6) inches of soil from beneath the liner will also be excavated. Upon the removal of all the pit contents, including the liner, the pit will be backfilled with clean soil purchased from the land owner and contoured to allow natural drainage and the site seeded with a seed blend approved by the land owner.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☒, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE _____ **TITLE** Field Technician **DATE** ____

Type or print name: Bradley Blevins **E-mail address:** bblevins@chkenergy.com **Telephone No.:** (505) 391-1462 ext. 24

For State Use Only

APPROVED BY: _____ **TITLE** _____ **DATE** _____
Conditions of Approval (if any):